

ANATOMY OF A WHIRLWIND

Some enlightening facts to demystify nature's dark side

By KEVIN R. RICHARDSON
and DAVID SCHWAB

Scientists know much about the causes of tornadoes, but agree there's no telling exactly where they will strike or what damage they will inflict.

"They are interesting because they are so capricious," said Casey Zois, a professor of meteorology at Kean College in Union. "I've seen instances where a tornado has completely destroyed one side of a street and left the other totally intact."

Meteorologists say tornadoes are violent whirlwinds that tend to develop when a cold front lifts warm, moist air as it passes over an area. These winds whirl at speeds up to 300 miles an hour. Often they accompany severe thunderstorms.

Tornadoes can vary in width from several hundred feet to about a mile. They move at an average of about 30 mph, according to Zois, who said there are several hundred tornadoes a year in the United States.

Tornadoes in the Garden State are relatively rare, according to authorities. Fortunately, when they have hit they have caused few, if any, serious injuries, the experts added.

Nathan Reiss, an associate professor of meteorology at Rutgers University in New Brunswick, said there are an average of five confirmed reports of tornadoes each year in New Jersey. Most occur between April and October, he added.

There have been three reported tornado episodes this year, and that does not appear out of the ordinary, according to Reiss. Because tornadoes are so infrequent and unpredictable, a year may go by without a report while there may be 10 the next year, he said.

Tornadoes in New Jersey also tend to be short-lived, often measured in minutes of duration and tenths of miles in distance traveled.

Nationally, tornadoes are five times more likely to strike in areas of the Midwest than the Northeast. And, there, they tend to be more severe and capable of traveling greater distances.

Not all reports of tornadoes are confirmed later by experts from the National Weather Service. They look for signs of a tornado's distinctive cyclical wind patterns and hit-or-miss action—like tractor trailers blown in a

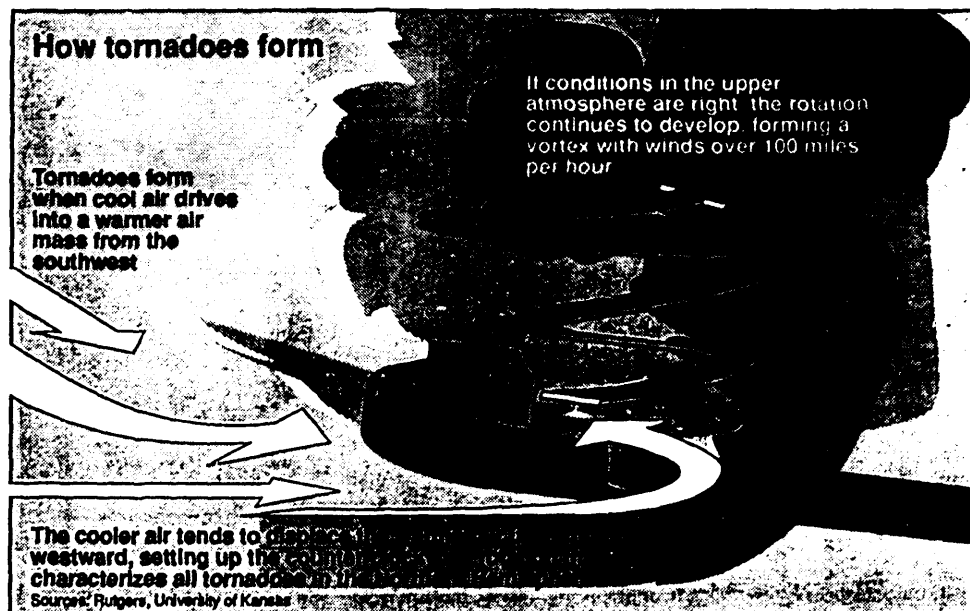
How tornadoes form

Tornadoes form when cool air drives into a warmer air mass from the southwest

The cooler air tends to push the warmer air westward, setting up the conditions that characterizes all tornadoes in the region

Source: Rutgers, University of Kansas

If conditions in the upper atmosphere are right, the rotation continues to develop, forming a vortex with winds over 100 miles per hour



Star-Ledger/L.H. MARGURGER

circle while trees nearby show no damage.

Tornadoes tend to avoid cities and heavily developed areas, possibly because tall buildings can hamper their development. They usually spring up in open fields and near waterways, according to experts.

In the three earlier confirmations this year of tornadoes in New Jersey, no injuries were reported.

The most recent struck the Woodbridge-Perth Amboy area in August. The month before three tornadoes touched down in areas of Passaic and Bergen counties, including near the George Washington Bridge.

In both episodes, tornadoes almost instantaneously left a narrow path of destruction, ripping up trees, roofs, and power lines. Damage was estimated in the millions of dollars.

A tornado touched down in Philadelphia in June and skipped across the Delaware River to Camden, where it caused minor damage to some homes.

The last time a tornado caused any serious injury in the state was Au-

gust 1941, when a tornado left a 75-mile path of destruction from Gloucester to Middlesex county, according to information provided by the NWS. One person was killed near Woodbridge and 25 others were injured.

Since the mid-1700s there have been reports of tornadoes producing the most startling kinds of damage, according to accounts in the New Jersey Weather Book.

Six persons were killed on Aug. 23, 1885, in the Camden area in a fury of wind and rain that was described in contemporary accounts as raking the ground like the fire of a cannon.

On July 22, 1903, a dark, dense cloud descended from the hills near Paterson and, in less than ten minutes, skipped over the area, demolishing 30 buildings and damaging 300 others. Four persons were killed and 25 others hospitalized.

More recently, a tornado bent flagpoles and damaged about 100

homes in two retirement villages in Berkeley Township on June 29, 1982. Another tornado on July 13, 1975, caused \$10 million worth of damage in Cumberland County.

Tornadoes have proven they honor no landmarks or boundaries. A twister dubbed the "Bicentennial Tornado" touched down in Bayonne on July 7, 1976, within sight of the Statue of Liberty. It tossed around some tractor-trailers at a pier before heading over water.

Gas main blast routs families in Wyckoff

By PATRICIA CAPPON

Fallen electrical wires triggered a fiery explosion in an underground gas main as a storm raged through Wyckoff yesterday, forcing 20 families from their homes.

The rupture in the gas line that runs along Lawlins Road occurred about noon as heavy winds and rain battered the Bergen County town, ripping through a warehouse roof and downing trees and power lines.

The gas main fire was sparked by an electrical wire that came down and burned through the ground above the gas line, causing a rupture, said John Yoder, a spokesman for Rockland Electric Co.

"When a wire sparks, it will actually burn a hole in the ground," he said.

The electrical wires and transformers that caused the fire came down with telephone lines when the wind snapped two utility poles, said Wyckoff Administrator Bob Shannon, emergency management coordinator.

The storm blacked out about 510 homes in the Wyckoff area, Shannon said.

Yoder said he expected that power would be restored to all homes by mid-day today.

With the smell of gas thick in the air, families were evacuated as a precaution, said Wyckoff Police Capt. John Ydo. There were no explosions and no injuries were reported, he said.

"The young officer who saw that gas main blow was very excited on the radio, that he needed assistance and that there were flames shooting into the trees," Ydo said.

The blaze was extinguished quickly by firefighters, he said.

By 4 p.m., crews from Public

Service Electric & Gas Co. had turned off the gas in a line leading to the rupture and the fire burned out, Ydo said.

All but four families were allowed to return to their homes at that time. The four remaining families may be permitted back in today, he said.

"There is a danger until we can get that gas shut off," he said. "They will remain evacuated until we can be assured there's no threat."

Some telephone lines were damaged by fire and several other power lines were down in the area, Ydo said. Two cars were damaged by falling trees.

During the evacuation, some families sought shelter in the firehouse, but most went to the homes of friends and relatives, he said.

The force of the storm momentarily lifted up the roof of the warehouse at the Ribbon & Ticker Paper Co. at 205 Braen Ave., about six or seven inches, blowing out the skylights. Water surged through the gaping holes in the roof and damaged numerous cases of product, leaving "a mess" in its wake, said company salesman Paul Hoben.

None of the company's 30 employees was in the building at the time, he said.

A building inspector from Hawthorne ordered the building closed until roof repairs could be made, Hoben said. He said he expected the company to open as usual this morning.

"We've been in business for 95 years and we've been through worse," he said.

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